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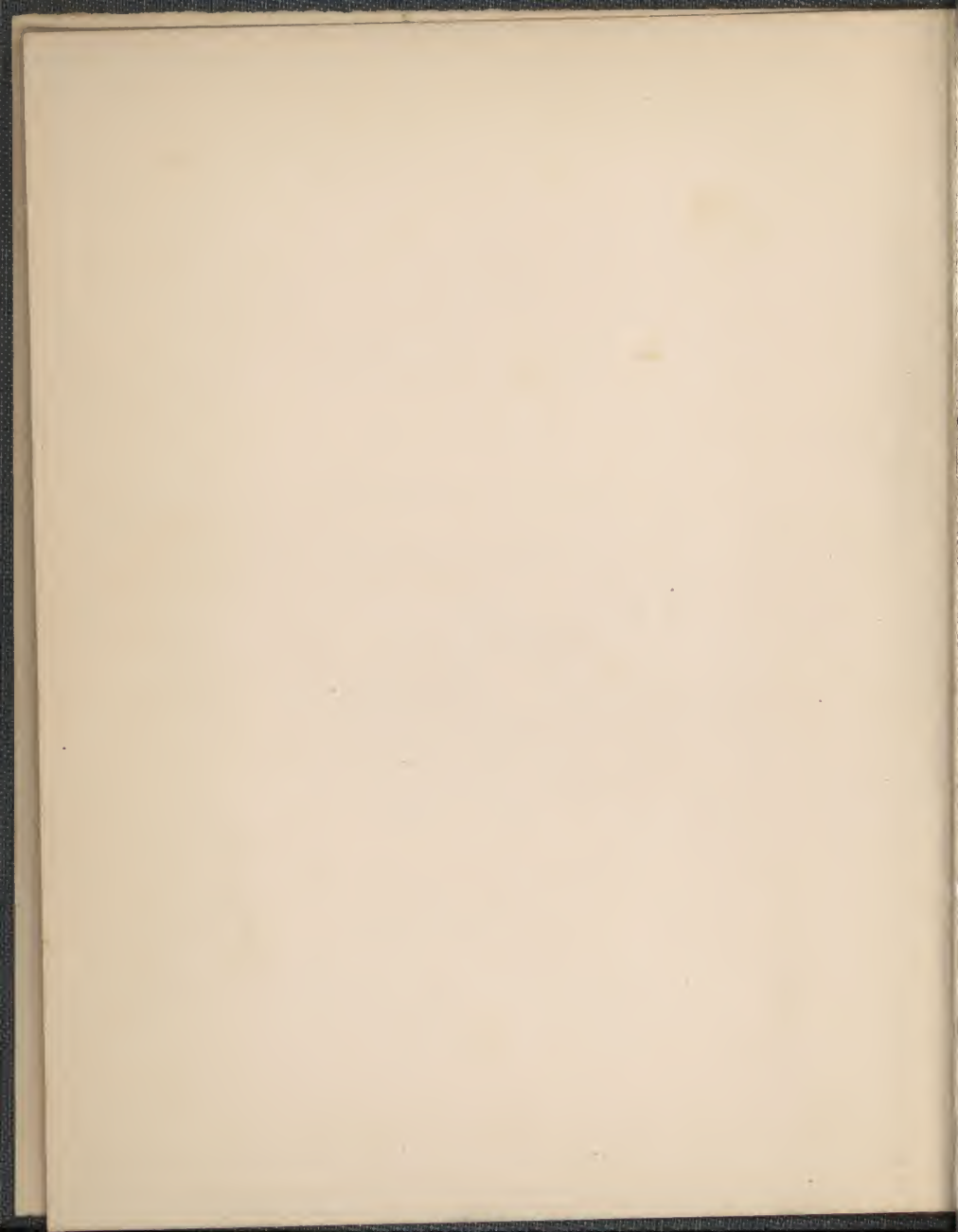
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HOW TO MAKE
ARCHITECTURAL
MODELS

Titles in the Series

CHILDREN'S GARDENS

by Edwin Howard

DOLL MAKING

by Grace Lovat Fraser

SIMPLE WOODEN TOYS

by Fred Haslam

MODEL AIRCRAFT

by Richard Chick

MODEL TANKS

by Richard Chick

Uniform with this book: cloth $6\frac{3}{4}$ x 5 inches

MAKE IT YOURSELF
ARCHITECTURAL
MODELS

By Robert Forman



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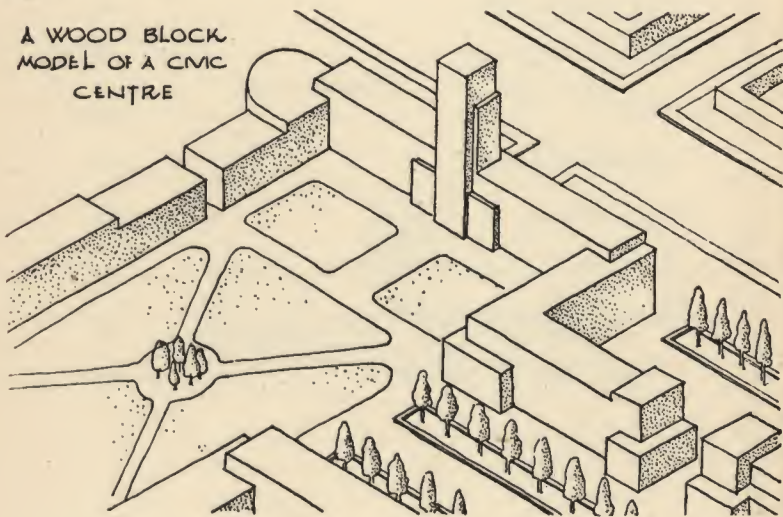
THE VALUE OF MODELS

THE making of models of buildings is applicable not only to the study of the architectural student but also to the work contemplated in rehabilitation centres, craft schools, progressive primary and secondary schools where town planning and citizenship are allied to history, and advanced training centres. This small volume is intended to appeal to all who are interested in these activities and finally to those who desire a very pleasurable hobby capable of giving much practical instruction.

Models, too, tackle real problems of design; they are "live".

Fig. 1.

A WOOD BLOCK
MODEL OF A CIVIC
CENTRE



Even a perspective drawing of a projected building provides only the viewpoint from a single angle. The advantage of the model is that all viewpoints are obtainable just as they would be were the actual building erected. A sculptor makes a model in order to grasp the essential form of his future large-scale project. A building is comparable to a piece of open-air sculpture inasmuch that projections and mouldings, as well as the general masses, will develop through atmospheric conditions, tendencies of light and shade difficult to regulate over the drawing-board. As regards internal lighting, the application of the model is even more essential and students can conduct their own investigations by this means. Models can prove a valuable aid to working out not only the circulation of a building but also how various structural features will function in application. For example, the packing, handling and dispatching of goods may require operative platforms at various levels. In some cases, such as the mechanical sorting of letters or laundry, chutes, traps, moving bands or similar devices are necessary. The efficient working of these features can be studied in model form.

Models are also useful for the explanation of various processes used in the manufacture of a particular product. This type of model is highly popular for exhibition work. Models are indispensable to the student of town planning. Apart from the demonstration of an ideal layout on a level site they are particularly useful where hilly country is concerned. Hills may reveal buildings to advantage or conceal them completely and must be considered with the general grouping as regards the disposition of roads. A gradient model greatly assists when designing bridges where river banks vary greatly in relative levels. A typical town-planning model of a civic centre, made from wood blocks (a process which will presently be described), is shown in FIG. 1.

Many fine historical buildings, through alterations and additions of unsuitable modern extensions, have been completely spoilt. This is another instance where the model can be used. By its aid the correct proportion, colours and texture can be decided on a small scale and the additional structure designed to fit in harmoniously with the existing portion. The procedure is to first prepare a model of the existing work and then the new portion is made separately and fitted to it.

Apart from solving vital problems of siting and design, models play a very active part in developing valuable instincts. Not only does the student cultivate an appreciation of architectural design, but the process necessitates personal decisions on such questions as scale, colour, finish of materials, etc. As the work progresses an orderly sequence of operations is involved bearing a close affinity to the conditions in actual building practice. He will assimilate knowledge that should prove of incalculable value in his career.

MATERIALS AND TOOLS

BEFORE proceeding with the various types of models here is an inventory of tools and materials required. A great deal can be done by the use of everyday objects found in the office and home, but a few other things are necessary for more elaborate efforts.

Apart from blocks of wood and other useful scraps of timber, stripwood, Balsa etc. are most useful. For large flat surfaces, such as baseboards, plywood or one of the many kinds of building or hardwood boards is obtainable. Plywood, already provided with a composition surface, can be used for floors, surrounds, fitments,

etc. Wood veneers, mounted on fabric or paper, are excellent for interior surface effects. Veneer pins or fine gramophone needles can be used for fixing. Apart from ordinary glue, Seccotine, Gloy, Gripfix are all useful adhesives for mounting.

Various papers and cardboard are used, ranging from straw-board to Whatman. Decorators' old pattern books can be put to a variety of uses. For plaster modelling, plaster of Paris, Gesso powder and Alabastine are all excellent. Various oils, such as olive oil and sweet oil, are used in this process. Artificial clays are good for experimental or temporary modelling. There is the new medium Pyruma plastic cement which is bought already to use and becomes stone hard on air-drying or baking. It can then be sized and painted with water or oil colour.

Plastic wood is good for filling nail holes, cracks, etc., in highly finished work.

Odd pieces of glass are used for decorative effects, mirror glass in particular providing excellent ponds and pools. Many of the plastic materials, Perspex, celluloid, etc., can be utilised for the representation of glazing.

Paint and colours range from distemper and oil paint to the finer brands of poster and water-colours. Sometimes models can be treated with the materials to be used for the actual job. Plastic paint is ideal for all kinds of textured surfaces.

Amongst various tools you will require a small hacksaw with interchangeable blades, a small plane, pliers, screw-driver, a dovetailing saw, penknife, tweezers, drills, razor blades, chisels, a try square, a steel straight-edge, boxwood scales, brushes for painting, an awl, glass-cutter and scissors. These are all particularly useful, but no doubt you will collect various improvised tools as you progress. Architectural students, who are most ingenious as regards improvisation, use sorbo, matches, wire hat trimmings, coloured sandpaper, etc.—in fact almost anything that comes to hand—to gain required effects.

WORKING TO SCALE

At this stage there is a very important point to be observed. Before making a model it is necessary to have a scale drawing or dimensioned sketch from which to work. For this purpose a small drawing-board, T-square, set-square, some boxwood scales, a few drawing instruments and the usual accessories such as pencils, rubber, drawing-pins, etc., will be required.

The model maker should learn to draw to scale and be able to read scale drawings. It is obviously impossible to make drawings of certain objects, in this case buildings, the actual size of the objects. Thus the scale drawing which shows the object greatly reduced in size is evolved. The drawing must be the same ratio of proportion as the object, and plans, elevations and even sections (when the interior is to be modelled) will be required. On it will be shown complete dimensional detail from which the model maker can work.

Every dimension, usually in feet, is represented by a similar unit in the drawing. This may be perhaps 1 inch or $\frac{1}{4}$ of an inch, or even less. FIG. 2 clearly shows a portion of a 1-inch boxwood scale with the dimension to be scaled. The actual 2 feet 6 inches in this case being represented by $2\frac{1}{2}$ inches on the scale. The scale is governed by the size of the building, and when it is large it may be necessary to use a ratio of $1/16$ or $1/32$ of an inch to 1 foot. For clarity of explanation FIG. 3 illustrates the type of drawing which is necessary for working purposes, in this case a small summer-house. The drawing is to scale. A drawing of the complete structure shown in FIG. 11.

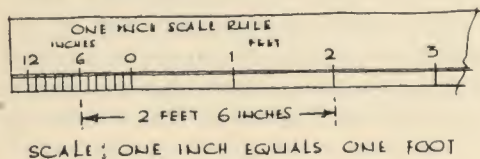
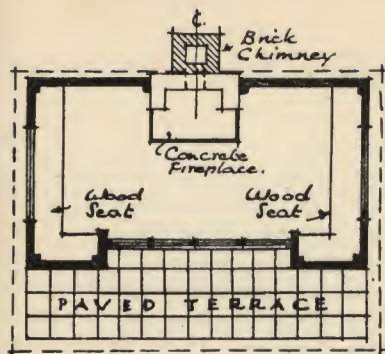
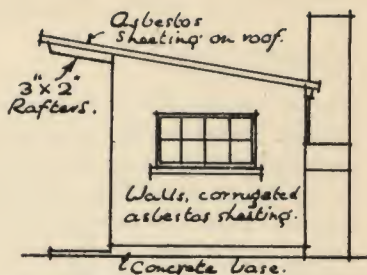


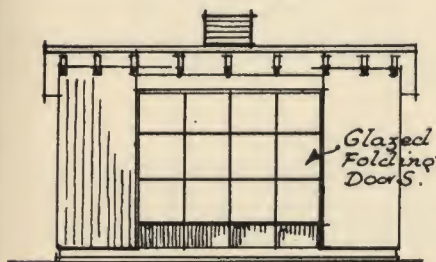
Fig. 2.



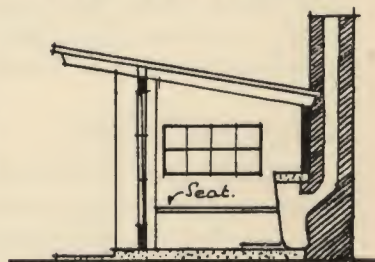
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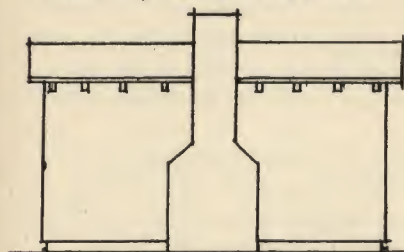
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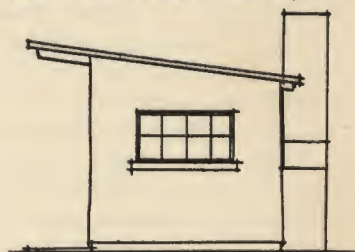
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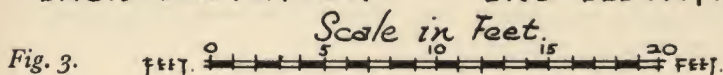
SECTION THRO' CENTRE



BACK ELEVATION



END ELEVATION.



TYPES OF MODELS

PAPER MODELS

As a speedy aid to the solution of some problem of design the paper model is often adequate. Plenty of paper is always at hand; therefore it is the most natural and inexpensive material.

A system of folding, pleating and paper clips is used. The rooms in a building can be represented by mere paper boxes fastened down to the drawing-board with pins or weights. Diagonal pieces of cardboard will provide temporary supports. The paper model should be accurately set out and coloured before cutting out. If coloured in position the paper will no doubt cockle and shrink, pulling everything out of shape. Details for setting out and fixing typical paper shapes are illustrated in Fig. 4.

CARDBOARD MODELS

Closely allied to the previous type, a similar method of handling is used. You can set out a paper model, mount it on stiff cardboard, and then cut it out, leaving suitable tabs for fixing the units together by means of paste.

On cardboard models you can build up small detail, such as mouldings, by means of successive strips of cardboard. The chief trouble encountered is that of expansion, followed by contraction, unless you use only the best materials and a reliable paste. Experiment will determine the strength and types of the most suitable paste, cardboard and paper.

FIG. 5 illustrates a typical cardboard model of a cottage, which is practically self-explanatory. An interesting method of fixing the building to the base plate is shown. Details such as doors, windows, etc., were set out in pencil and coloured with poster colours.

The model was cut out on a sheet of plate glass, an ideal cutting surface, with a razor blade. Tabs, after glueing, were held in position with paper clips until dry.

SETTING OUT PAPER BOX

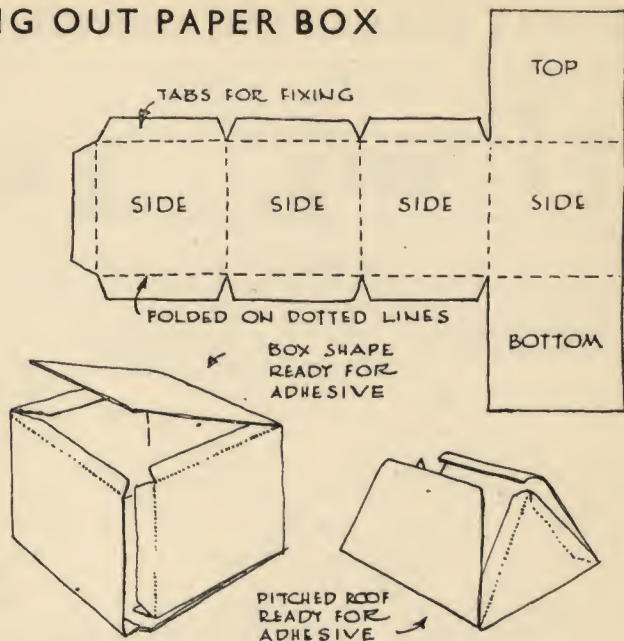
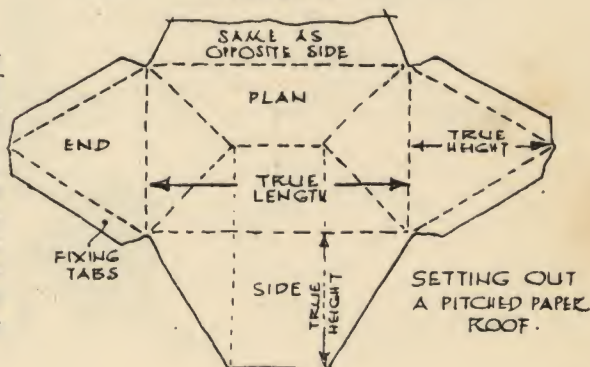
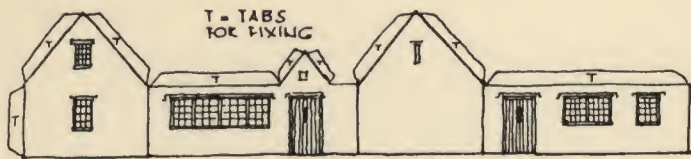


Fig. 4

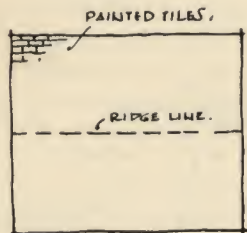
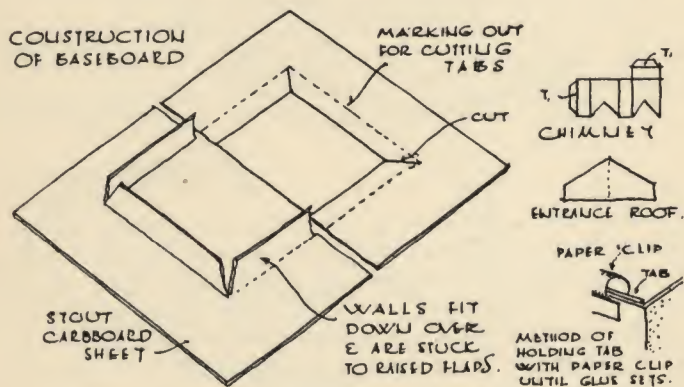
Sketches showing the principles of setting out simple paper models. Note use of tabs for fixing, also bevels. True lengths are necessary. The student can develop his ideas from these first exercises.



SIMPLE CARDBOARD MODELS



SETTING OUT OF THE WALLS



SETTING OUT OF ROOF.

THE COMPLETE COTTAGE NOTE APPLIED DETAILS.

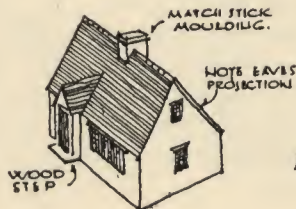


Fig. 5.

WOOD BLOCK MODELS

Simple wood blocks are very widely used to-day, especially for layouts of large buildings and town-planning schemes.

FIG. 6 shows a simple factory building, constructed of wood blocks. A diagram of the blocks is included. Note the little refinements which were cut from slices of wood and then glued in position. Windows, doors, etc., were drawn on paper and then stuck in position, the mouldings helping to bind them to the walls securely. The blocks were cut on a mitre block and all surfaces well sandpapered before painting. Small items but on the reduced scale of models, minute detail and finish is important. The blocks were glued together and finally nailed to a plywood baseboard.

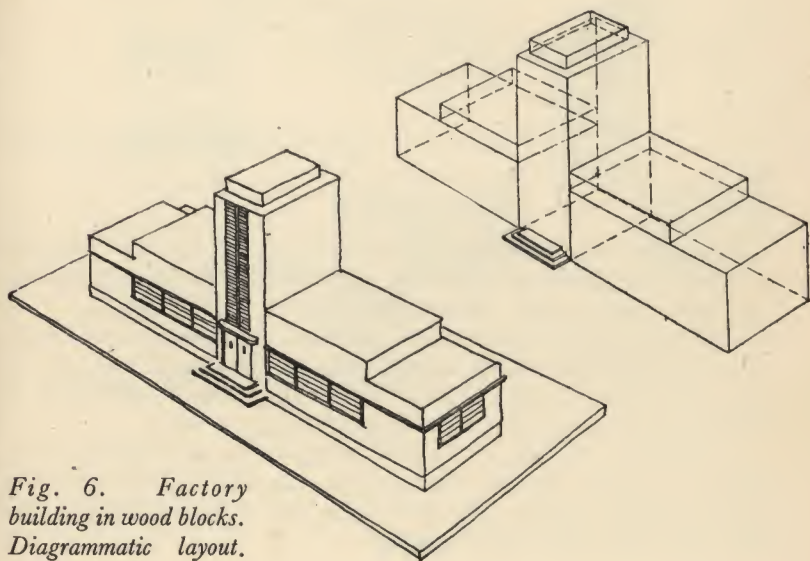


Fig. 6. Factory building in wood blocks. Diagrammatic layout.

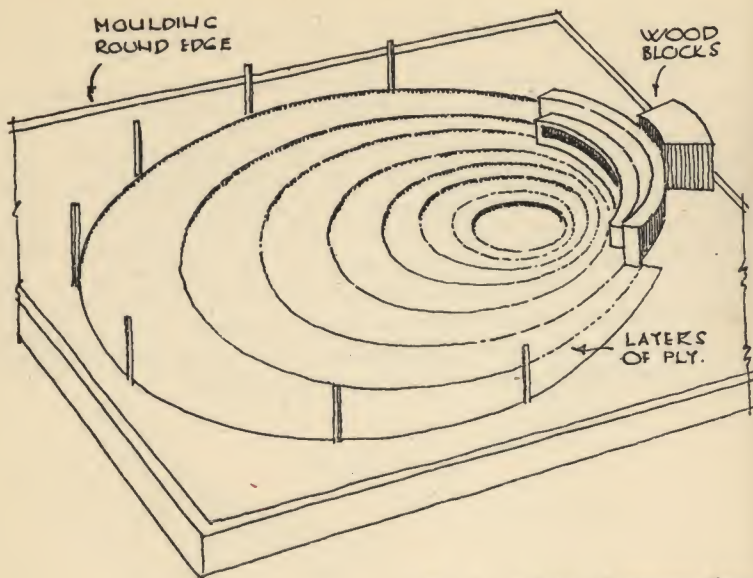


Fig. 7. Model of open-air theatre

FIG. 7 is a similar type of model of an open-air theatre. Note the interesting treatment by means of plywood layers and the masking moulding which really conceals the edges on the baseboard.

I know of a famous American designer who found wood blocks very useful for industrial design, and as his experiences are of general interest I include these notes. His problem consisted of discovering the most practical shape for a gas-cooker.

To assist in arriving at a decision regarding the suitable basic shapes he used various wood blocks coloured to represent the various compartments. The illustration, FIG. 8, shows some of the units and how they were arranged.

Apart from emphasising the value of simple wood blocks to the model maker, the idea has possibilities of development in various fields of design.

Not only are wood blocks especially useful for conducting rapid experiments in design but they are an ideal treatment when modelling large-scale planning layouts requiring the representation of many buildings. The main masses of the buildings are cut out to scale from blocks and the elevational treatment can be drawn out on paper, suitably coloured, cut out and glued over the face of the blocks.

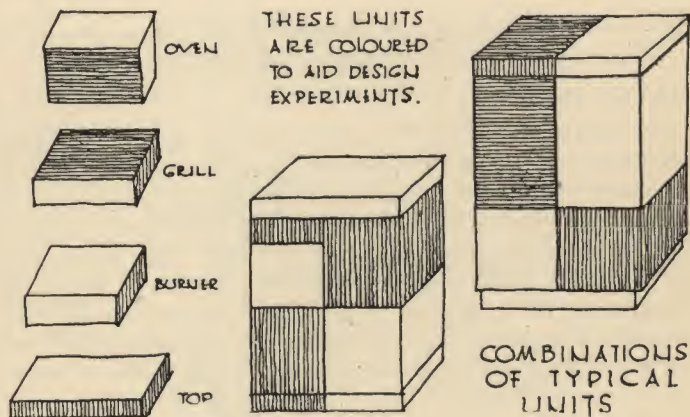


Fig. 8. Wood blocks as an aid to design.

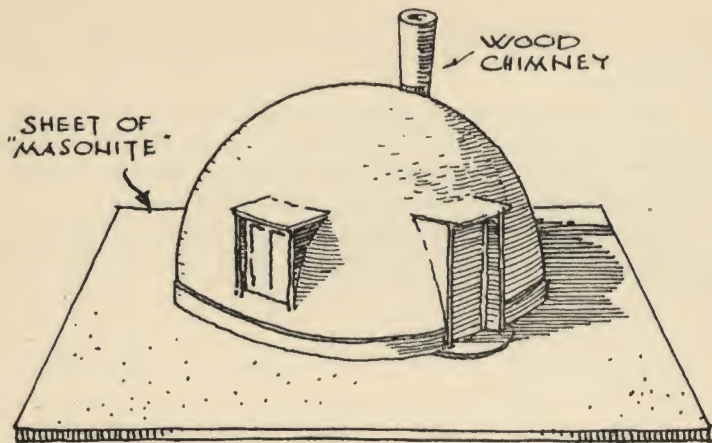


Fig. 9. Sketch of a model of an American "Bubble" house, cast and carved in plaster. An ideal treatment for concrete buildings.

CARVED MODELS

The carved model is often neglected because tools and materials are not so easily at hand. However, it is often more satisfactory to cut away than build up, especially when only a general mass is required. It is particularly useful for curved surfaces. (See FIG. 9.) Bath stone, Caen stone, plaster, Alabaster, cork, brick and wood are all used. Again, you can use slabs of some of these materials and cement them together to form the required shape. Such tools as saws, rasps, files, gauges etc. are used, and with crumbly materials it is advisable to cut in from the edge of the mass rather than towards it, otherwise you may break off too much at once. For small detail scraping is often sufficient. Cork is a good material, it can be glued easily and manipulated with simple tools. Paper models can be strengthened by backing with cork slabs. With carving you use the sculptor's approach inasmuch as you apply your dimensions to the main mass and work down to the detail.

PLASTIC MODELS

The most popular material under this heading is Plasticine, admirable because one can add or subtract portions without drastically altering the basic shape. It is chiefly used for temporary work. A scale and dividers can be used for checking sizes as the main masses are built up. A plywood or zinc template is used for retaining the required profile. The plan of the building can be pencilled on the base-plate itself before starting to build up. With large models the clay may require reinforcing with such items as match sticks, copper wire, skewers, etc. It is made in several pleasant colours. FIG. 10 illustrates a typical plasticine model.

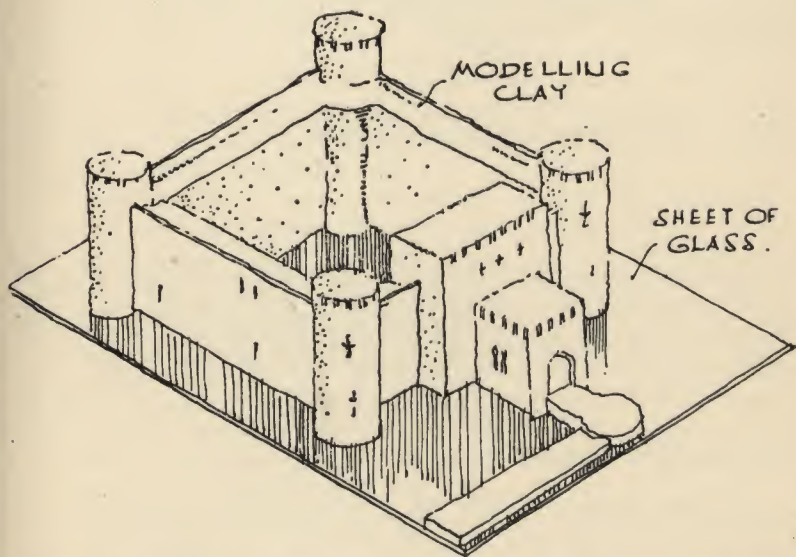


Fig. 10. Sketch of a plastic model design for a mediæval fortress. The glass base provides an excellent imitation moat.

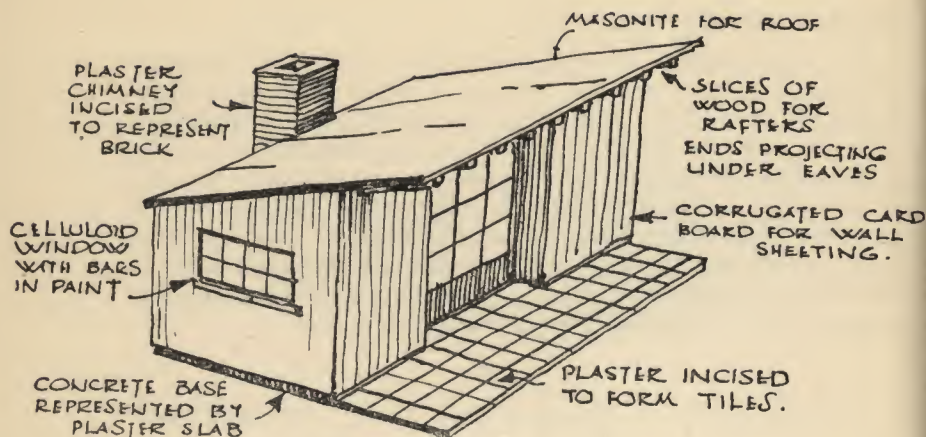


Fig. 11. Perspective of model of summer-house.

There are other types of plastic cement such as Pyruma, a ready-to-use medium which becomes stone hard on air drying or baking. It can be painted or enamelled and is obtainable in artists' and handicraft shops. It is extremely good for landscape work.

COMPOSITE MODELS

Although models can thus be broadly classified, as a rule a combination of these methods just described is employed on one model. To illustrate this is a perspective of a summer-house (FIG. 11) constructed from the typical working drawing, given earlier in FIG. 3. The base of the model was a plaster slab, the front portion

forming the terrace being scored to form crazy paving. While still soft the upright posts of the building were stuck into the plaster. Corrugated cardboard represented the wall sheeting and the roof was of Masonite board, laid on wood rafters. The small end windows and entrance doors were celluloid with the glazing bars drawn in Indian ink with a ruling pen. The fireplace feature was modelled in plaster, painted red, and the brick courses then scraped with a pin which produced the white mortar joints.

These are a few suggestions which may inspire the student to realise the wide field of improvisation embraced in model making.

PROFESSIONAL MODELS

After this classification of the types of models likely to be attempted by the amateur model-maker, brief mention may be made of the work of the professional model-maker. There are several important firms employed on the work of model-making in this country in addition to many individuals who have gained enviable reputations for their work in this field of craftsmanship. A great deal of their work appears in exhibitions and is testimony to their ingenuity and skill.

For their models they use generally much more permanent materials than the amateur. These include hardwoods of fine colour and texture, enamels, metals, etc. They employ very often the cabinet-maker's methods of construction involving dove-tailing, mitreing and other features common to the furniture trade. In fact a large measure of their time is spent in solving small-scale, intricate constructional problems as the thoroughness of their finished work testifies. To execute their work a proper workshop with specialised tools and machinery is necessary. Without these it would be an almost impossible task to get through in time the amount of work they attempt on a sound financial basis.

It would be a good idea for the amateur model-maker to visit such a workshop. His ideas would receive a definite stimulus and he would return to his own work refreshed. His work need not in any way prove inferior, providing he gives of his best.

PLASTER MODELLING

PLASTER has already been referred to as a medium suitable for carving, and the material is so useful in model making that it warrants a section to itself. The modeller can do his own plaster casting. For this a simple form of shuttering, similar to that for concrete construction, is made. (See FIG. 12.) All the inner surfaces of the shuttering must be oiled to prevent the plaster adhering to the wood. Next the plaster itself must be prepared. First put cold water into a suitable receptacle and then distribute the fine particles carefully into the water, filtering it slowly through the fingers. Stir gradually until a thick creamy mixture is obtained. Do not stir too

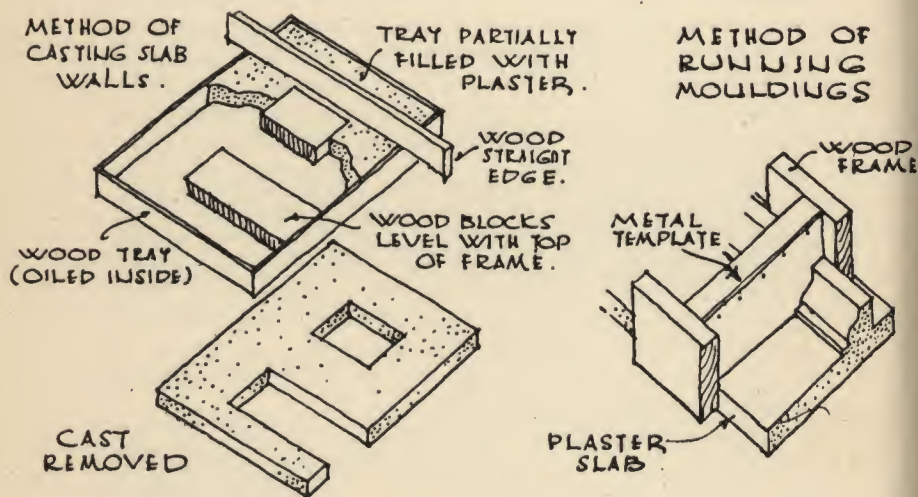


Fig. 12. Plaster modelling details.

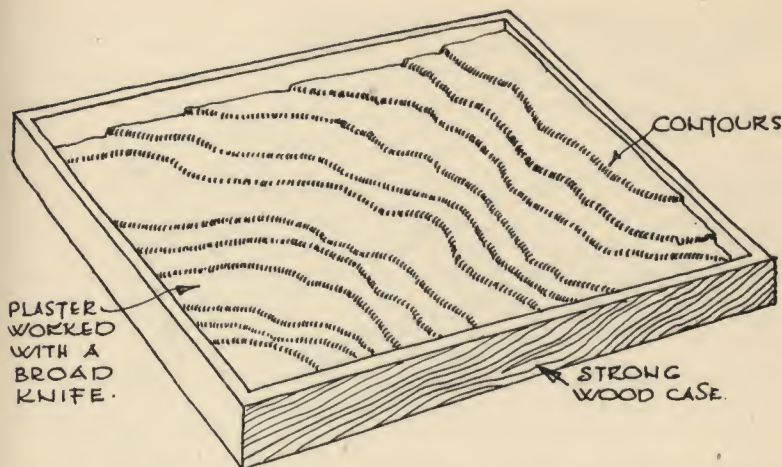


Fig. 13. A base-plate for the development of a sloping site. Contours modelled in plaster inside a strong wood case.

vigorously, otherwise you will trap air, "killing" your mixture. Do not add fresh plaster or water to already mixed material. Water size may be used to delay the setting action. For the moulds such oils as sweet oil and olive oil are used. After mixing the plaster is poured in, the mould being removed when it is hard and dry. If there are lines or other details to be incised they may be done while the plaster is in the mould when partially set. A set-square or a straight-edge can be used for striking a level top.

Once various portions of a plaster model have been cast they are propped and supported in the required position for fixing on the baseboard. Joints are made sound by using scrim rubbed in plaster and placed on the inside face of the walls of the model, covering the joints. Walls are attached to the baseboard in the same manner. Spaces remaining can be keyed later and filled with fresh plaster. If plaster surfaces to be joined are hard and dry, they should be

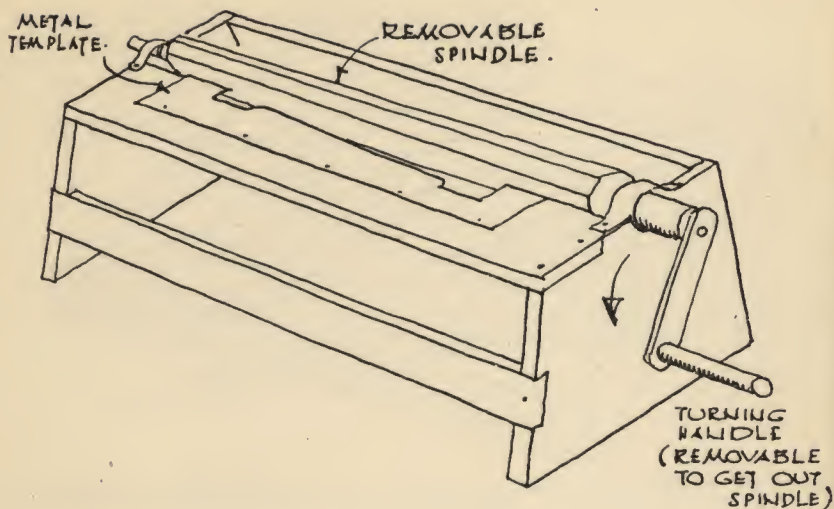


Fig. 14. A home-made wood lathe for turning plaster columns.

damped before joining. Actually joints in plaster models need not be too clean, especially if corners are mitred, as a key must be left for filling up with fresh plaster.

Providing it will subsequently receive careful handling, the plaster model is an ideal treatment for exterior large-scale schemes. It is especially useful for making a contoured base-plate. (See FIG. 13.)

Cornices and similar mouldings when required can be run in plaster as in actual practice by making a metal template of the desired moulding profile.

Columns still play a large part in many architectural compositions and the keen model maker may find it well worth while to construct the simple little wood lathe shown in FIG. 14. Two typical columns are illustrated in FIG. 15.

By using a metal template cut to the profile of the required column the plaster can be turned to the shape. The tapering spindle of the lathe must be well oiled, and when a fairly stout column is intended a key can be formed by wrapping it round with a piece of scrim cloth after the first coat.

Build up the column with repeated coats, mixing only sufficient plaster for the coat in hand. Do not let the mixture get too stiff. The last coat will be very fine, and to complete the column turn it dry to ensure a smooth finish. In any kind of plaster work, especially turning, keep the templates scrupulously clean, otherwise you will scratch the newly formed surface with the hard fragments.

The mass of a building can be cast in plaster and finished off by carving with suitable cutting tools. When carving plaster you may find it getting hard and dry, but this can be obviated by immersing the entire block in water for a while. Draw out your design in scale

on the various sides of the block and cut away the large planes of surface first, gradually working down to the smaller ones, and finally the complete detail. For detail work on large models this simple type of plaster carving has also many uses.

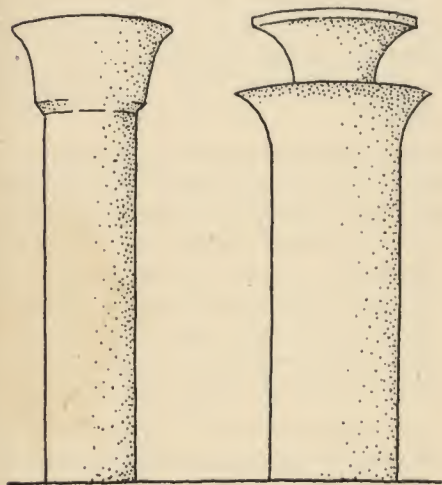


Fig. 15. Two typical turned plaster columns.

DOMES AND VAULTS

It is difficult to picture mentally from drawings the completed appearance of domes and vaults. By means of models, however, the correct light, shade and disposition of intersections can at once be seen in their true relationship. It is also difficult to draw lines which will appear as ellipses in section or in perspective, but when a model is made pins and threads can be used to define these lines.

Many excellent jobs have been carried out abroad, the design for which was originally settled by means of scale models in an English drawing office.

Vaulting is to-day invariably formed in concrete, reinforced by various standard types of metallic mesh. By the aid of models experiments can considerably extend the designer's scope in work of this nature. It is possible to set out to scale small sheets, represented by thin paper, to cover the curved surfaces. These can be easily adjusted to suit the problem in hand. By this method it is possible to reduce practically any curvilinear shape to a suitable number of geometrical plane figures.

A similar method is applicable to problems regarding the decoration of vaulted and domed surfaces. The convex shape of the dome or vault is formed in plaster and then covered with a piece of tissue paper. On this the decorator sets out the main lines and outline of the masses of his proposed decoration. A true shape has been obtained and it is comparatively simple for the decorator to enlarge the shapes, etc., on squared paper to the full size of the actual work. He is now assured that when he transfers his cartoons to the actual roof of the finished building they will fit the appointed space.

To ensure absolute accuracy for enlargement the surface should be grided with both horizontal and vertical lines marked on the paper skin of the model before it is cut up in sections after removal.

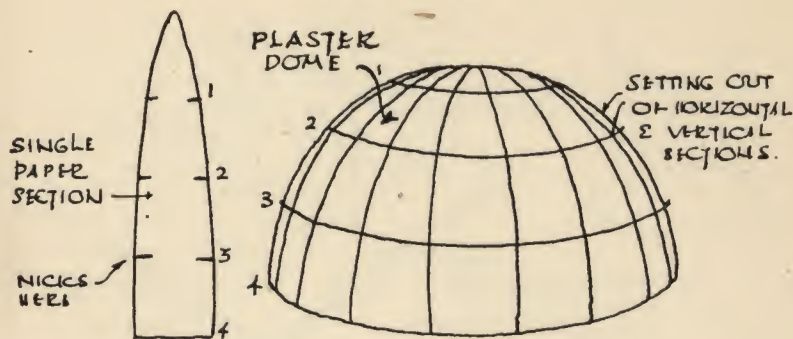


Fig. 16. Setting out and cutting paper to obtain true shapes of plaster dome.

The more lines used the greater the accuracy. The curved sections of paper can be nicked at the sides to assist in retaining the curved shape. This is illustrated in FIG. 16.

As regards the construction of the dome or vault, if it is a solid model these features can be carved in plaster, wood, cork, or modelled in plastic cement. Such templates as illustrated in FIG. 17 should be used for continually checking the accuracy of the curved shapes.

For the interior model, or interior and exterior combined, where a hollow shape is necessary, a solid core, which is best formed of plaster or wood, will be required. Over this is placed a film or several films of plaster, lightly reinforced, if necessary, with scrim cloth, and a plaster cast taken from the core, as shown in FIG. 18. Before a cast is made from a plaster core it should be given several coats of shellac, and when this is dry, oiled to prevent absorption and adherence of the covering plaster.

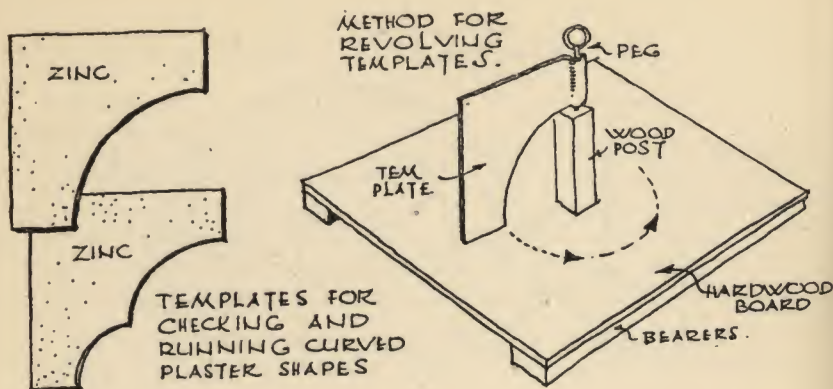


Fig. 17. Typical templates for running and checking curved plaster shapes, with a simple home-made turntable.

The templates shown in Fig. 17 can also be used for running curved shapes in plaster. By fixing a template to a central wooden post and peg on a baseboard, it can be revolved to produce the shape.

This home-made turntable can be formed with a small sheet of Masonite board for the base, supported on two light bearers. The working surface may be painted or given several coats of shellac before it is oiled to prevent the wet plaster adhering. A zinc template, attached to a metal peg well inserted in a central wood post, as shown in the above sketch, completes the table. The peg is removable so that the template is easily lifted clear after the plaster shape has been turned.

Clean the templates carefully after each run. The plaster should be fairly thick with a fresh mixing for each coat, but as you approach the final coat the mixture can be thinner, or the under

layers, as they dry, will absorb moisture rapidly from the succeeding coats.

By using suitable templates and acquiring a knowledge of plaster casting, all kinds of curved shapes, both interior and exterior, can be modelled.

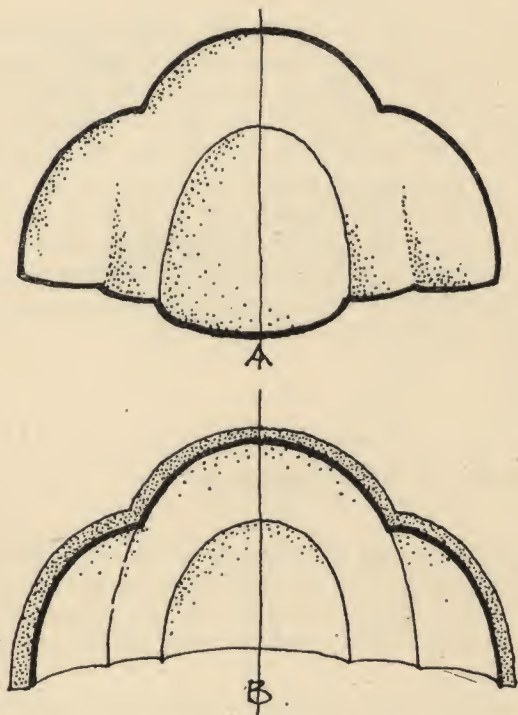


Fig. 18. A: plaster or wood core. B: cast (showing section) taken from the core.

INTERIORS

ARCHITECTURAL interior models are often combined with the exterior. One-storey structures lend themselves readily to this treatment. Purely interior models are usually of single domestic apartments, designed for the purpose of illustrating the decorative treatment and furnishings.

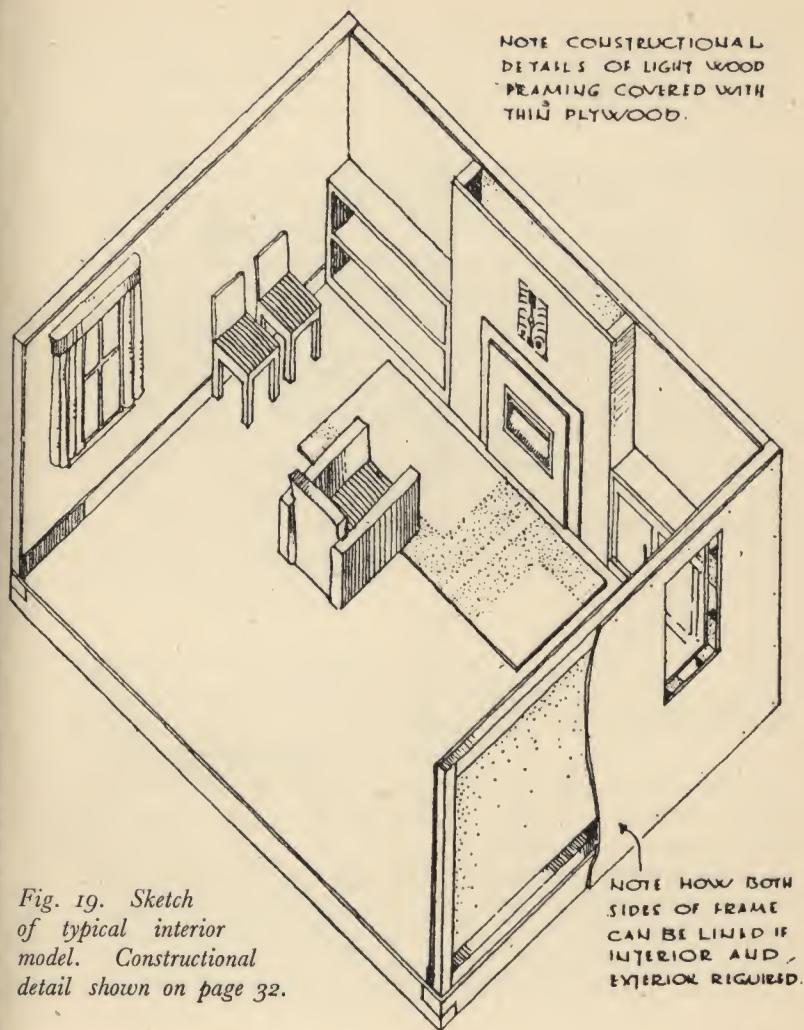
The term "interiors", however, is very comprehensive, and includes churches, schools, village halls, hospitals and other public buildings as well as domestic interiors both period and modern. There are so many different types that description is confined to the general processes required for making basic portions.

Unless the two aspects, interior and exterior, are combined the walls for purely interior models can be built of plywood on light framing (see FIG. 19). In the illustration is shown a method of adopting this form of construction for the combined type of model. The walls are fixed to a baseboard of similar construction and the work is cleanly and accurately finished.

TREATMENT OF WALL SURFACES

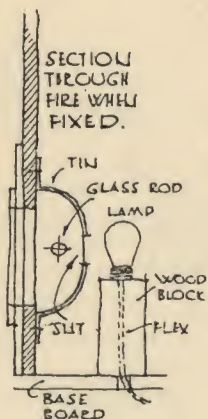
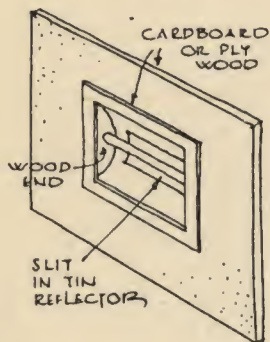
Next is the treatment of wall surfaces. This may incorporate wallpaper or paint and often it is possible to use the actual material to be used in the proposed building. The use of wallpaper, however, is limited to the textured variety, for any patterned paper would be out of scale.

When a plastic finish is necessary this material should be handled sparingly, otherwise the texture will prove overpowering. An equally convincing effect can be obtained by the use of paper from the

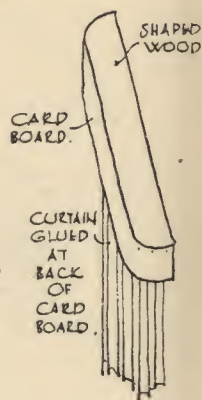


*Fig. 19. Sketch
of typical interior
model. Constructional
detail shown on page 32.*

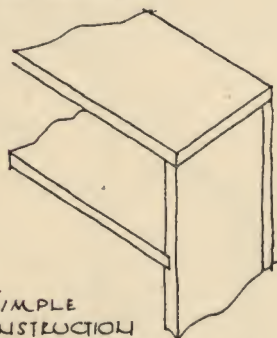
ELECTRIC FIRE



PELMET.

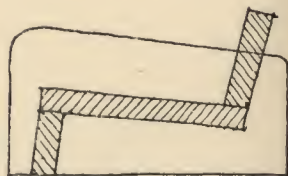


BOOKCASE



SIMPLE
CONSTRUCTION
FOR MODEL
SHELVING.

ARMCHAIR SECTION



CUT OUT OF WOOD
SECTIONAL VIEW CLEARLY
SHOWING THE TYPE
OF CONSTRUCTION.

Fig. 20. Constructional detail for typical model furniture and fitments.

decorator's pattern-book. Poster colour, distemper and oil colour can all be used. With the last named, however, apply thin coats, otherwise it will appear too thick and oily. Whatever material is used, bear in mind the important point of the relationship of scale and texture.

Closely linked with that of the walls is the proposed floor treatment. Often the paper or similar material, if applied to the walls first, can be firmly bound down and finished neatly by applying a miniature wood skirting over the foot of it. Floors may either be painted or laid with material to represent tiles, lino, etc.

Incising of lines, as used on exteriors, is useful for the representation of tiles and wood inlay. Glass may be used but it requires careful handling and cutting to ensure a neat finish inside the walls.

When carpets or rugs are required it is best to avoid the real thing which is generally out of scale with the model. Instead use thick paper. When a pattern or design is necessary this can be painted on to the paper with poster colours or distemper. Paper coated with wet oil colour and dusted with fine flock provides an excellent imitation rug. Various textured wallpapers achieve such an effect in themselves.

FURNITURE AND FITMENTS

The various constructional details in FIG. 20 are all fairly typical problems encountered by the designer and are fixed when completed in the interior shown in FIG. 19.

The convincing electric fire surround was cut from cardboard. The reflector is a strip of aluminium tacked to two semi-circular pieces of wood, bored with a hole through which is passed a glass rod. When the lamp housed in the chimney breast is switched on, a glow is projected through the slit, behind the rod, giving the impression of an actual glowing filament. This is a detail requiring time and trouble, but the result is well worth the effort. Similar problems often occur in model making.

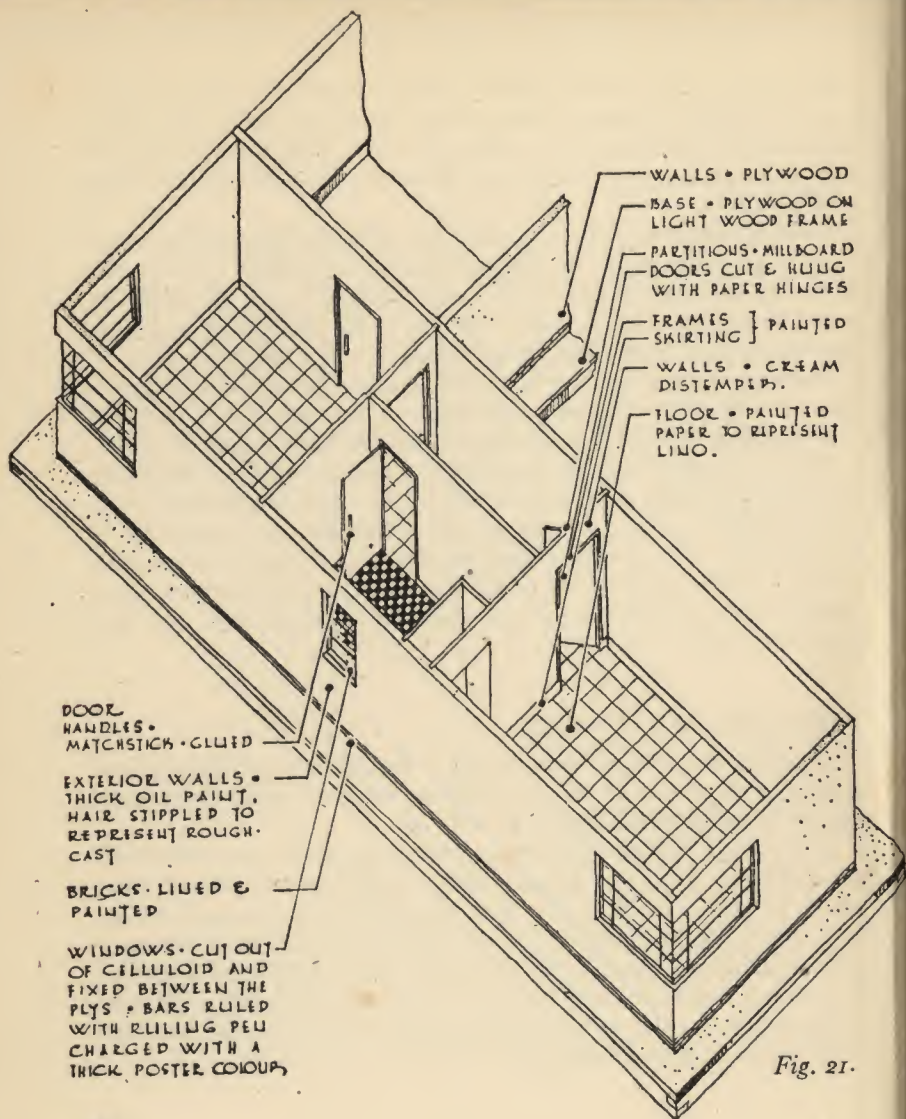


Fig. 21.

The detail of bookshelves applies to most shelves and features of this nature. The pelmet and armchair details are self-explanatory.

The illustration FIG. 21 indicates more inexpensive methods and materials used in model interior treatments.

The walls in this case were made of three-plywood and the celluloid windows were let into the plywood itself. Partitions, naturally thinner than exterior walls, were of millboard. Paint was very widely used to gain required effects, which are annotated on the drawing opposite.

Naturally the fitments and furniture are of the utmost importance and the highest quality of craftsmanship is necessary. The strictest attention must be paid to scale as the use of too-coarse materials will destroy this. The most suitable wood for the purpose of furniture construction is the close-grained sycamore, which will give the cleanest of finishes.

Model steel furniture can be made from suitable wire, bent to the required shape and treated with aluminium paint or silver lacquer. Handles for wood furniture can be made from minute pieces of boxwood.

If the entire feature consists of a solid block the divisions for drawers and doors can be incised in the surface of the wood or veneer with a sharp-pointed knife.

The designer will develop for himself fresh ideas as he advances in the craft of model making. The object is to avoid losing scale and to execute the work with as much finish as possible in accordance with the time and materials available.

Fig. 21. Some of the inexpensive materials and methods used on an interior and exterior model.

DETAILING MODELS

PAINTING THE MODEL

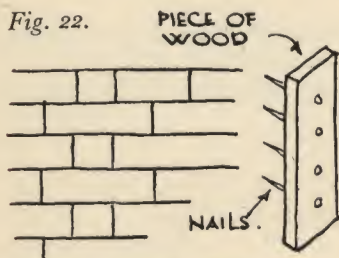
OFTEN the amateur model maker devotes much time to building a model but spoils an excellent effort by bad finishing, especially as regards paint-work. It is unnecessary to build up a finish, unless you are employed on a permanent effort, by the usual number of priming coats. It is sufficient to use only suggestive colouring.

When painting walls, paint the edges of the door and window openings. This is a help when fixing the glass or the material which will represent glass later.

With wood models the rough end grain which will appear on the exterior corners should be sandpapered down, holes filled with putty and an endeavour made to remove all unevenness. Whatever material you select for a finishing coat apply it smoothly with as fine a brush as possible.

Do not paint poster colour over smears of glue, otherwise unsightly patches will result. Sandpaper all the surfaces clean, especially at joints, before commencing. Glue is usually sufficient for holding the parts of a wood model together, but where extra reinforcement is necessary use fine cabinet-maker's pins, making holes to take the pins to avoid splitting the wood. Blocks can be placed in the interior angle to strengthen the walls.

It is presumed that the designer has a sound knowledge of building constructional detail. If he is not sure of some point, reference to a good building construction manual will solve the problem. For instance, see that the bonding of brickwork or stonework is correctly marked in accordance with



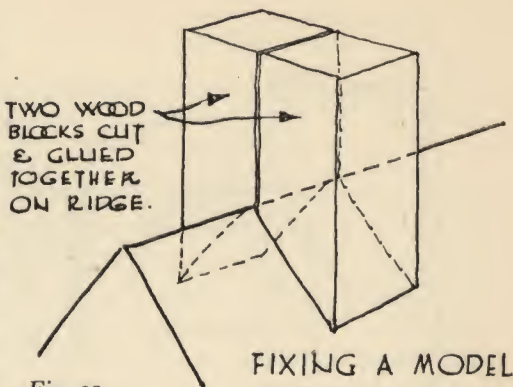
HOME-MADE TOOL FOR
MARKING BRICK & TILE
COURSES. VERTICALS PUT
IN AFTERWARDS

the scale of the model, otherwise the whole thing will appear absurd. In FIG. 22 is shown a speedy method for marking out brickwork or stonework.

There are various methods of treating exterior surfaces to achieve stone or concrete texture. One treatment is to flick sawdust or pumice powder on to a coat of wet oil paint when it

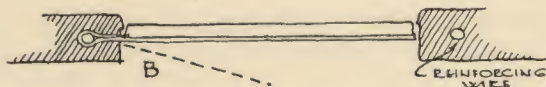
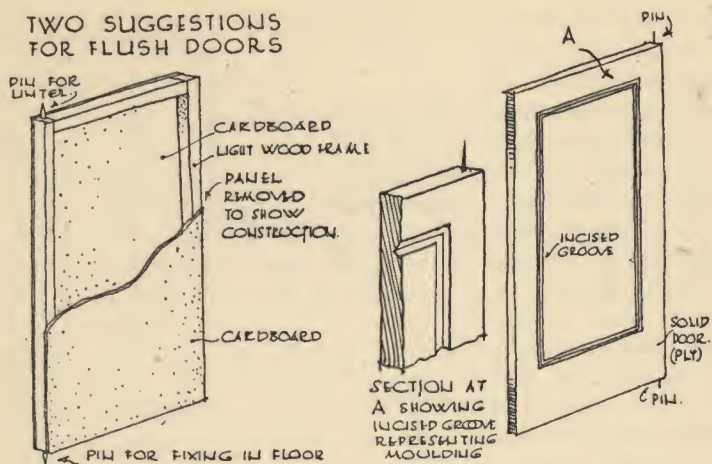
has almost set. Again, one of the many types of stone or plastic paint may be used, lightly stippled with a fine sponge or brush. The latter produces an imitation of rough cast which is most convincing.

Slates or pantiles can be marked and incised as with brickwork. Actual tiles, if the scale of the model warrants it, can be cut out of paper or cardboard to the proper shape of the real tile. Cut them in the proportion of depth one-half the width and glue them down with the correct overlap. Start as in actual practice at the eaves and work upwards to the ridge. Another method is to cut ridges in the roof to represent the edges of the tiles. Chimneys can be made in one piece and fitted to the roof. On ridges it is sometimes difficult to get the right angle for setting and in this case it is better to cut the chimney in two halves (see FIG. 23) and fit these at each side, glueing firmly into position. Such details as gutters, cornices and other mouldings can all be cut from simple wood mouldings. As the model maker progresses he will devise methods of cutting strips of moulding for future use.



FIXING A MODEL
WOOD CHIMNEY

TWO SUGGESTIONS FOR FLUSH DOORS



PLAN OF A PLASTIC MODEL DOOR. THE DOORWAY IS LINED WITH REINFORCING WIRE FROM WHICH DOOR IS SUSPENDED

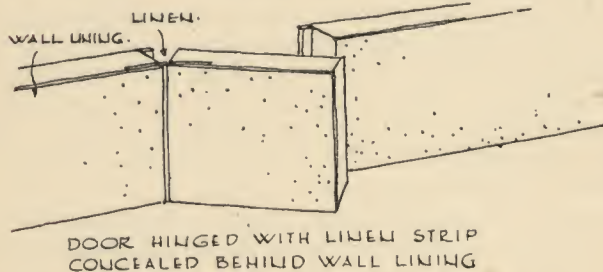


Fig. 24. The treatment of model doors.

DOORS AND WINDOWS

The more detail you incorporate in a model the greater interest you provoke.

Doors that open and shut is one item that is well worth while. For the old-fashioned type of cottage door strap hinges and pintles can be fixed and the door hung as in actual practice. A modern, flush door can have small pivots at the top and bottom which can be embedded in the floor and the corner of the lintel. The architrave moulding can conceal any deficiencies of fixing. On the extra large-scale model such details as these can be to scale and all the actual door fittings produced in miniature.

On the paper and cardboard models a portion merely need be folded back or a long strip of paper can act as a hinge. With plaster the hinge can be embedded in the wall and with Plasticine linen is best. See FIG. 24 for typical examples.

The treatment of windows varies with the type of model. The applied type can be set out on cartridge paper. After the area is painted-in solid, window bars are drawn with a ruling pen charged with coloured ink or fluid poster colour. See that such detail is strictly to scale. In modern architecture with its extra large areas of glass windows, bars have an important part to play in retaining the stability of a design. On the solid, carved or moulded model it is sometimes possible to indicate windows by dabs of paint, the area being marked out in thin pencil lines. For the more intricate model real glass or celluloid is often introduced. Permanent and important models often have quite a lot of glass in their construction.

There are times when it is possible to have window bars cut from such materials as pasteboard, or again they can be actually made out of wood on a miniature scale. This latter method is more a task for the professional. Celluloid, which can be cemented with Durofix, is more convenient for handling than glass.

In wood models where an interior and exterior are combined the apertures can be cut with a fine saw. All the edges of the openings must be well cleaned with sandpaper. See that all your corners are very sharply defined. When there is too deep a reveal make a small recess by removing several layers of ply at the back of the wall.

The glass or plastic material to represent glass is glued in position. With plastic materials the lines representing window bars should all be drawn on the material before fixing.

Use French chalk to kill the grease on plastic surfaces, particularly celluloid.

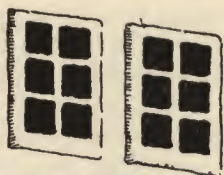
With real glass, if the scale of the model is sufficiently large, you can glue strips of wood or card to the glass and round the edges of the window, but on most small-scale models such elaboration is rarely necessary.

The points mentioned are clearly illustrated in FIG. 25.

Although the information I have given more or less applies to amateur types of modelling, when a proper detail of actual glazing is being prepared, this must be scrupulously accurate and demands a high finish. Celluloid, when used in permanent models, is liable to subsequent discolouration, therefore real glass is preferable.

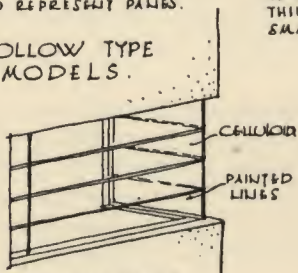
The object is to achieve as realistic an impression as possible.

PLASTER & CARVED TYPE OF MODEL



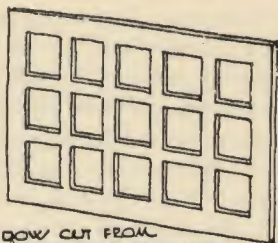
RECESSES CARVED
IN FACE OF PLASTER
WITH PAINTED BLOBS
TO REPRESENT PANES.

HOLLOW TYPE MODELS.

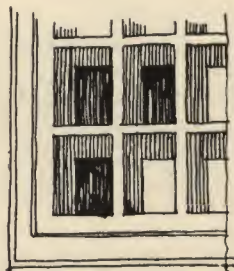


CELLULOID SET IN PLY
WITH GLAZING BARS RUN
IN WITH RULING PEN.

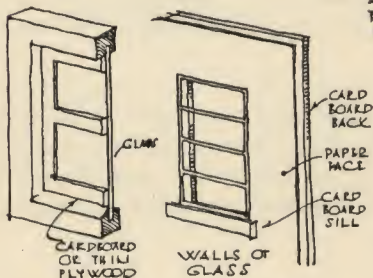
CARDBOARD AND WOOD MODELS.



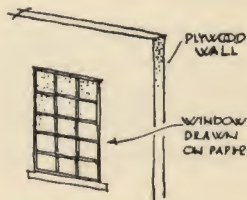
WINDOW CUT FROM
THIN "BRISTOL" BOARD. USE
SMALL CHISELS TO CUT OUT SHAPES.



A PAINTED SURFACE
TREATMENT TO GIVE A
REALISTIC ATMOSPHERE



BUILT UP WINDOWS.



PAPER GLUED
ON SURFACE OF MODEL

Fig. 25. Details of typical model windows.

SURROUNDINGS

JUST as you cannot take a building and plant it down haphazardly without due regard to its surroundings, so you cannot take the model of your projected building and plant it on the baseboard and consider it completely satisfactory.

In the case of representing actual surroundings, particularly of existing buildings, you must beware of modifying these solely for the purpose of giving your design an impression of grandeur and scale greatly in excess of what will really be the case if the new building is erected. You will endeavour to make your design stand out, but commonsense and good taste govern the liberties which may be taken.

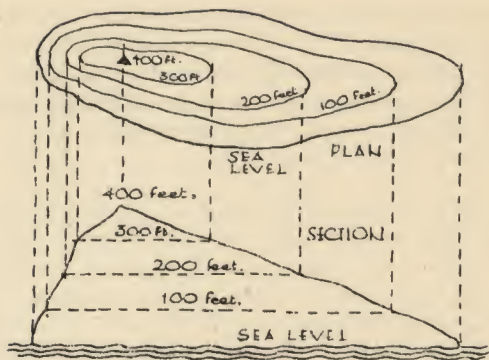
In the case of a building, however, say for a site in the country or on an open plot of land, one can exaggerate a little to the extent of providing perhaps a greater excess of foliage than really exists. For instance, although we know that foliage growing against the walls is bad for the structure, it is permissible to show some climbing growths against the walls of your model. It produces a sense of stability.

When you do include a garden layout such things as fruit trees, etc., should be correctly spaced to the miniature scale. Oriental work is much better than ours in the representation of garden treatments.

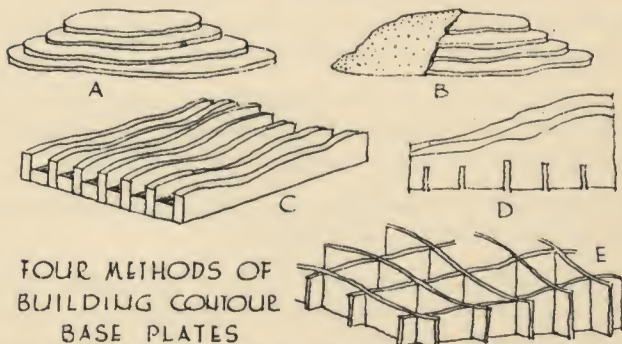
No doubt these foreign examples of the craft require great skill in handling and our own models are not meant to be such permanent affairs, but at the same time there is a lesson to be learnt from them by the discerning model maker. The ultimate aim should be to impress the spectator in as artistic a manner as possible.

CONTOURS

Contours are especially applicable to the work of the town planner when setting out a model of a large-scale site, but there



A SIMPLE EXPLANATION OF CONTOURS



FOUR METHODS OF BUILDING CONTOUR BASE PLATES

A. SUPERIMPOSED LAYERS OF MATERIAL. B. THE SAME FOUNDATION COVERED WITH CLAY. C. CONTOURS BUILT OF WOOD. D & E. SKELETON BASE OF CROSSING SECTIONS. HALVED JOINT SHOWN IN SECTION D.

Fig. 26.
Contours.

are occasions when a single building must appear on undulating ground.

For gently sloping ground the base-plate itself might be modelled by means of plaster, or clay for less permanent effects. When the ground is definitely hilly there are several methods. These, together with a simple explanation of contour, are illustrated in FIG. 26. The simplest treatment shows slices of plywood to the correct shape of the contours to be represented.

These can be covered with clay or plaster. If an elaborate job is called for they can be built of wood sections glued to blocks and covered with a suitable material. A similar method is illustrated embodying two sets of section planes which are slotted at points where they naturally intersect. Stout paper can sometimes be used as a covering and can be cut in suitably coloured strips, for roads, paths, etc.

When using the superimposing method, mentioned first, it is sometimes practicable to make the base-plate in slabs correspond to the contour lines on the ordnance map.

In the majority of cases it is preferable to leave the layers showing as clear, distinct sections with sharp edges rather than cover them with plaster to give an impression of natural ground.

To my mind the actual layers have an architectural quality highly desirable for architectural models.

Thick cardboard is easier to cut and manipulate than plywood and can quickly be painted with poster colours. An interesting treatment can be achieved on plywood by giving the layers, when fixed in position, a coat of paint. While this is still wet it is dusted with coarse sand or fine sawdust, dyed green. A similar treatment can be carried out on cardboard by using a slow-drying glue before dusting. The granulated surface gives a very convincing suggestion of grass.

FOLIAGE

This includes trees, hedges and similar growths. Hedges can be very simply represented by strips cut from a large piece of cheap sponge dipped in green paint or ink. If you are not afraid of soiling your hands, the paint, if oil, is often sufficient in itself to attach the artificial hedge to the baseboard, or pins concealed in the sponge or a suitable adhesive can be used. Trees can also be made from sponge (see FIG. 27) attached to the board by means of extra long pins with large heads embedded in the material. An ultra-modern tree made from a ping-pong ball is shown in this illustration and also a paper tree, the latter made by twisting fairly stiff coloured paper, impaled on a long pin. Fragments of coarse tweed cloth can be used, if desired, instead of paper, and on some occasions cotton-wool dyed in green ink is sufficient for small-scale foliage effects. No doubt, as the reader progresses, he will develop fresh ideas for his own individual representation of foliage.

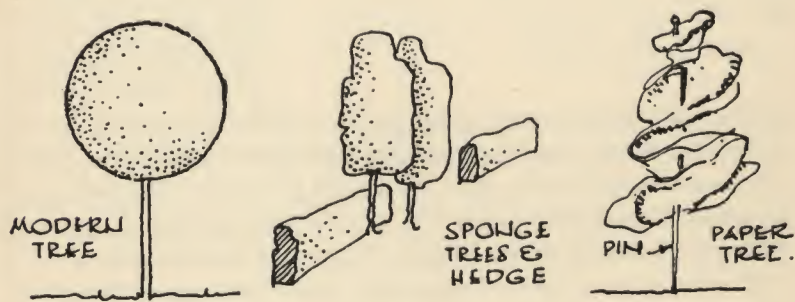


Fig. 27. Foliage.

PONDS AND POOLS

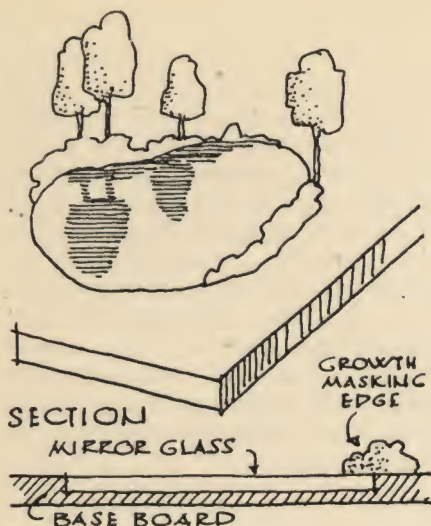


Fig. 28 a.

be devised. With the small model you can merely tilt it and pour off the water. Some kind of metal lining should be provided to hold the water in the model. FIG. 28 (a and b) clearly illustrates two methods of representing model ponds. In the first example a scrap of mirror is let into position below the level of the base-plate.

Care must be taken to have a very neat joint at the edges. It is possible to mask the edges with some sponge growths as shown in this sketch.

The second sketch shows how a really convincing impression can be obtained. A small wood box is sunk in the base-plate which must

be raised on blocks as illustrated.

The bottom of the box is painted dark blue, getting a lighter shade as it ascends the sides. A piece of green glass is let into the base-plate and the edges masked with appropriate foliage. This second method involves more work, and as a rule the former method will prove sufficient to indicate the small portions of water likely to be found adjacent to a domestic building.

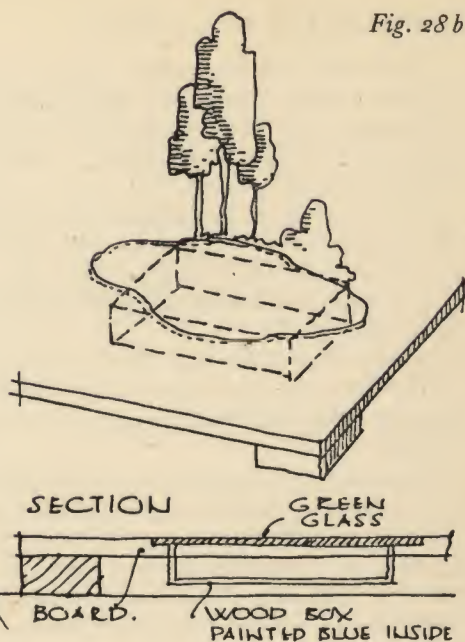


Fig. 28 b.

Large areas of water in a model can be best represented by a sheet of clear glass, with a conventionalised rendering in paint of green and blue areas in bands, on the underside of the glass. An example of such a treatment is seen in the model of a Ferryman's Cottage, in the supplement, on page 58. A sheet of celluloid could be treated in the same way. Obscured glass is obtainable with a nipped surface introduced during the manufacturing process, and can give a most convincing effect of moving water. By using a sheet of mirror glass as a baseboard for certain models, the reflection of the buildings in the glass gives a most realistic impression.

PATHS, ROADS AND FENCES

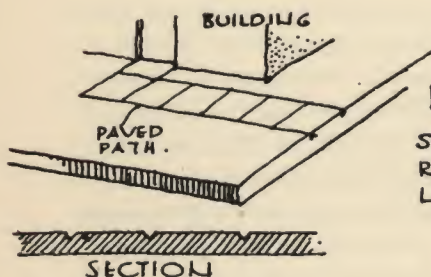
Paths and roads, especially with the contour type of baseboard, are best cut out of strips of paper. Some model makers prefer to use sandpaper, but unless this is extra fine it is inclined to destroy the scale of the model. Remember to keep these details in strict proportion to the building.

Crazy paving or brick paving can be incised lines on the base-plate rubbed over with colour and wiped with a rag, which leaves the incisions full of colour (see FIG. 29). Actual fragments of stone can be set in a thin layer of cement, but is only suitable for the very large-scale model.

Grains of sand give an effective imitation of gravel.

Threads, pins and match sticks are all used for making fences. Copper wire, also, has its uses for the manufacture of miniature railings.

Sometimes it is possible for the model maker to obtain miniature fences, gates or similar features cast in lead and coloured (primarily intended as adjuncts to toy farmyards or dolls' houses) at a scale suitable for incorporation in a model background. Fencing can be ensured firm support by introducing a little foliage at suitable intervals, the whole being firmly glued to the base-board.



DETAIL OF PAVING

SMALL SCALE PAVING CAN BE REPRESENTED BY V-SHAPED LINES INCISED IN THE BASE-PLATE

Fig. 29.

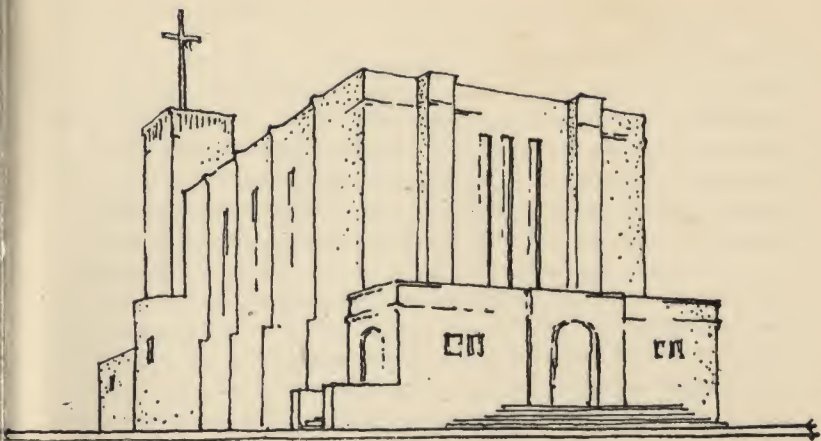


Fig. 30. One of the most effective view-points from which to photograph the model.

DISPLAYING, LIGHTING AND PHOTOGRAPHING MODELS

THE normal type of building in actual practice is generally surveyed at a level some five to six feet from the base. This important point is often ignored by the enthusiastic designer, and as a rule the model of the building is placed on a convenient corner of the drawing-board, surrounded by all kinds of large-scale objects. This at once gives it an inferior position.

Several types of model are best suited for a bird's-eye contemplation, especially the town-planning scheme and the large-scale layout. From this angle the various access roads, circulation and massing or grouping can be best examined. With the single building a different procedure is advisable. This type of model is best displayed on a pedestal with a platform which can be raised or lowered. By raising the platform the spectator does not require to crouch and crane his neck unnecessarily. The best effect is obtained by suspending a black curtain from a circular rod, surrounding the model on its movable platform. A light is suspended over and peepholes provided at eye-level in the curtain. A panoramic background at the level of the peep-holes also greatly assists in achieving an effect of reality. If all this is too involved or thought unnecessary, the model maker can still mount the model, cutting off parts which will not be seen with one another when the actual structure is erected.

For inspecting the interior of the type of model, where interior and exterior are combined, various ideas have been suggested. Trial and error have proved that hinged or sliding walls are better in actual practice than having a removable ceiling. It is an additional advantage if this can also be accomplished in sections, for to expose several apartments at the same moment makes it difficult to concentrate on individual colour schemes. The insertion of a periscope through a hole in the base-plate when the model is raised on the pedestal is the ideal method and one that interferes least with the natural lighting possibilities.

As a general rule, with the simple one-storey type of model, it is sufficient to have a removable roof for exposing the interior for inspection. On some models this is hinged, but with domestic buildings the roof can come cleanly away, with the chimney-pots and similar features fixed firmly to the roof. On the large-scale model the roof itself can be made in several sections for easy removal and convenience in handling.

ARTIFICIAL LIGHTING

The introduction of some form of artificial lighting is often essential to gain the full effects of a model. Perhaps only a fixed lighting is necessary to illuminate an interior or an exterior, or, again, a complete sequence of lighting is desirable. A knowledge of colour and the technique of electricity is essential unless, as will be the case of a complicated model, the assistance of the electrician is invited. By the use of judicious lighting subtle and interesting effects are obtained.

It is unnecessary to give the reader a detailed description of lighting circuits so far as ordinary fixed lighting is concerned. This will naturally be the same as ordinary house lighting. However, there are several methods of effecting light changes which it would be as well to mention. They are as follows:

- (1) Snap-change. In this case a distinct flash marks the change being obtained by using a change-over switch.
- (2) Snap and super-imposed change. Here before the first colour is switched off the second one is switched on. For this method a combination of switches controlling independent circuits is necessary.
- (3) Dimmed change. Whereby one colour gradually fades out and is replaced by another colour gradually increasing in intensity. This is achieved by introducing colour circuits controlled by separate dimmers. This dimming effect can be coupled with the superimposed change, and you have one colour building up before the first colour has disappeared.

For exhibition models colour changing effects may be obtained by employing automatic switching. This, however, is a job for the electrician and will no doubt be too advanced for installation by the amateur model maker. Where changes are desirable it is best for

these to take place smoothly without a violent jump in the sequence of colour.

Many interesting and beautiful colour combinations for the exterior illumination of models could be obtained by the use of florescent powders which are now obtainable. After treatment of surfaces it is only necessary to subject these powders to ultra-violet rays to obtain striking effects.

PHOTOGRAPHING MODELS

As a general rule this part of the proceedings is best left in the hands of the professional. However, some students who are amateur photographers may attempt their own photography. Lighting is one of the most important points, and whenever possible the model should be posed out-of-doors with a similar orientation as proposed for the actual building. Careful notes should be made of all useful data such as the date, time of day and other relevant information, for future reference.

The professional can often improve his original photographic impression of your model by re-touching or deleting portions of the background. Again, he can skilfully superimpose the photograph of your model on to another background. This superimposition method is particularly suitable when presenting the additions to existing buildings.

To get an impressive view-point the model should be photographed practically on a level with the base plate from a corner position (see Fig. 30), but with a large-scale planning layout a bird's-eye view-point is necessary. If possible, the edges of the base-plate should be outside the area embraced by the eye of the camera.

HANDLING AND TRANSPORT

THE majority of models are built of impermanent materials which necessitate careful handling. Convenience in handling can be greatly assisted by the provision of a strong base-plate and a thoughtful arrangement of joints, etc.

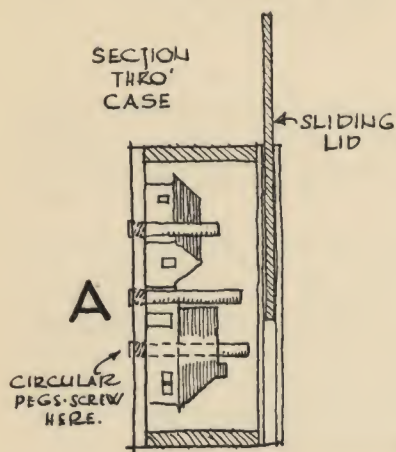
Plaster models, which should be strengthened during the process of manufacture, are prone to breakage. Internal reinforcement can be provided by strips of canvas embedded in the plaster itself or strutting consisting of small strips of wood. A framework of meccano or wood and packing by means of wood blocks are all methods which have been successfully adopted to obviate casualties. Generally the model maker carries with him the materials to effect speedy repairs before the model is finally presented.

Naturally, a permanent model, to provide a record of a building, will be much stronger than the impermanent type solely for the object of illustrating a design to a client. The latter type will possibly be destroyed eventually in any case, and so long as it serves its purpose, its handling qualities are fairly negligible.

As the model maker gains in experience he will discover for himself how some materials outlast others, how paint will flake on certain surfaces or how adhesives can play unusual tricks.

One of the most troublesome factors encountered by the model maker is that of unequal expansion and contraction of materials. For models destined for overseas this is a particularly important aspect—although for a model of this type the professional modeller would probably be consulted.

When packing a model for transport to a destination where it will be unpacked by strangers, instructions as to care in handling and methods for unpacking should be clearly printed on a label prominently attached to the lid of the box.



TWO SIMPLE BUT PRACTICAL
METHODS FOR SUPPORTING
MODELS IN CASES DURING
TRANSPORT

A - WITH ROUND WOOD
PEGS SCREWED TO THE
BACK OF THE CASE SET
TO HOLD THE MODEL RIGID

B - BY SCREWING THE BASE
PLATE TO THE BOTTOM OF
THE CASE - A SMALL SCREW
DRIVER SHOULD BE KEPT
IN THE CASE

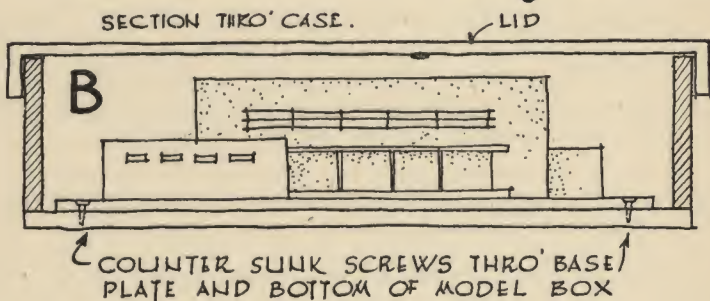


Fig. 31. The transport of models.

STORAGE OF MODELS

The storage of models is an item that is invariably overlooked by the architect. He receives a beautiful example of the professional model maker's art and in a few weeks it has been so carelessly handled that all its pristine freshness has departed. Its career is over and it will no doubt be speedily relegated to the top of some dust-laden cupboard. A sad end to hours of patient craftsmanship and what might have proved a valuable record of building.

The easiest types of model to store are the simple paper or cardboard variety, for these can be flattened out and retained with the original sketch designs of the job in the plan chest.

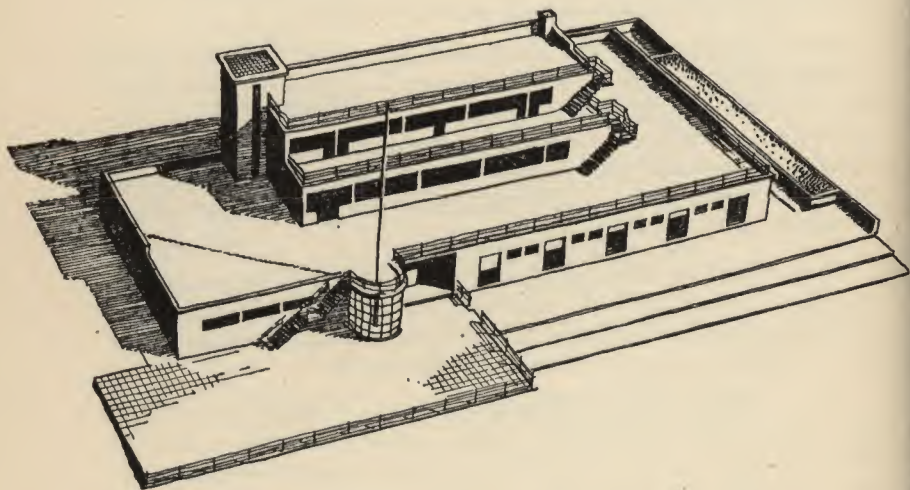
For the permanent type a suitable box should be made at the very beginning and even when working on the model it should be stored in this receptacle in the evening. If the model will eventually undergo a considerable amount of travelling the box should be lined with several layers of green baize or some other appropriate material. The model can be supported in the box either by shaped blocks or padded bars and stays.

Care should be taken to distinctly label the box, together with complete instructions for handling and unpacking. There are occasions when it is possible to attach the model to the base of the box by means of screws through the base-plate.

Once a thick coating of dust has settled on a model it is difficult to remove. For a very special model a dust-proof glass case is the solution, but as a rule the small-scale projects of the average architectural office can be kept in a cupboard, covered with dust-proof wrappings. The illustration, FIG. 31, shows two simple ways in which to pack a model for transport. In the first example short bars of wood are screwed to the back of the box and in the second sketch the method of screwing the base-plate to the floor of the packing-case is shown.

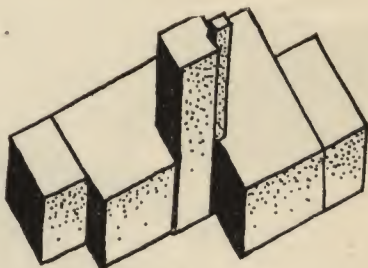
TYPICAL STUDENT MODELS

IN the following pages are shown drawings of typical models of buildings, some of which were made by the students of such well-known architectural training centres as The Architectural Association School of Architecture, London, and The Liverpool School of Architecture. This alone is testimony as regards the value of model making and also illustrates the scope to this type of work amongst students. A description of the materials employed in their construction should prove of value to the beginner.



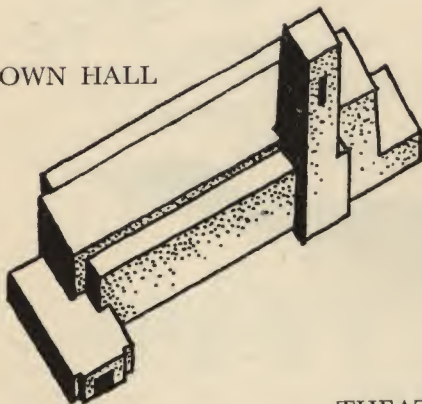
PORTION OF A MODEL OF A ROWING CLUB: second-year work at the Liverpool School of Architecture. Materials: baseboard of plywood; buildings of Bristol board; wire and metal railing; celluloid bay window and other windows; ripple glass over a coloured ground to represent water. (Courtesy the Liverpool School of Architecture.)

CINEMA



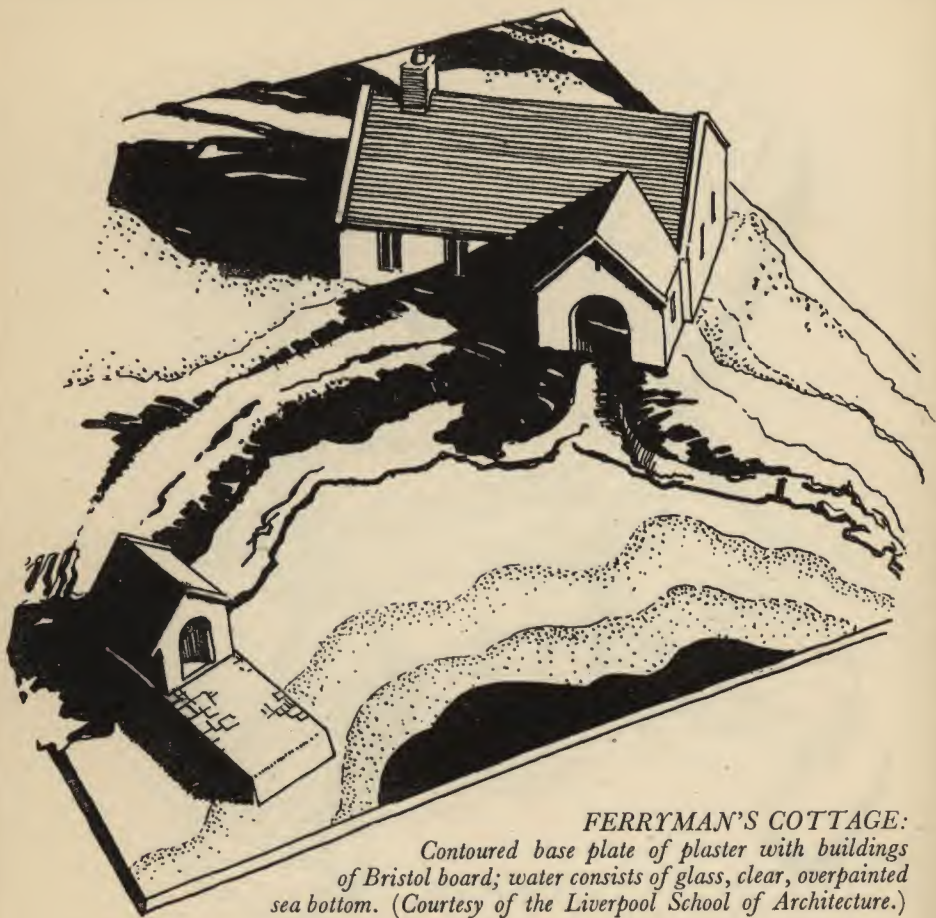
POWER HOUSE

TOWN HALL



THEATRE

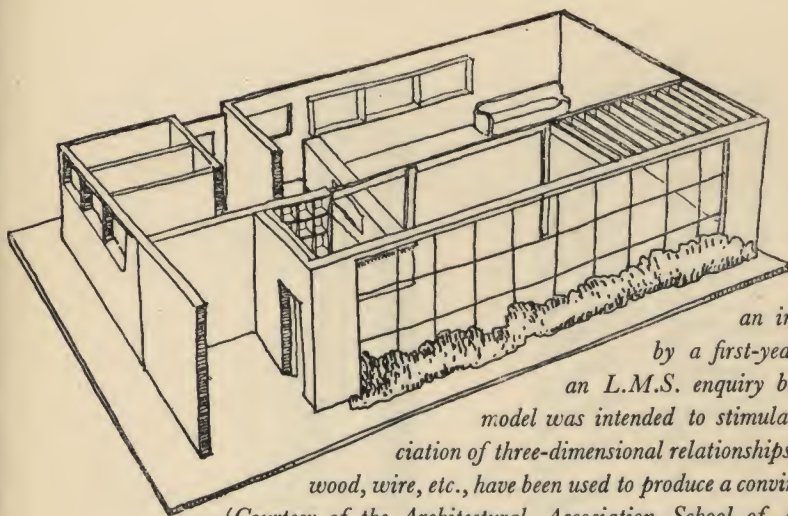
Some simple wood block models made for the purpose of studying architectural design, particularly the massing of units. Extremely useful for instructional purposes, and for composite town-planning schemes, etc.



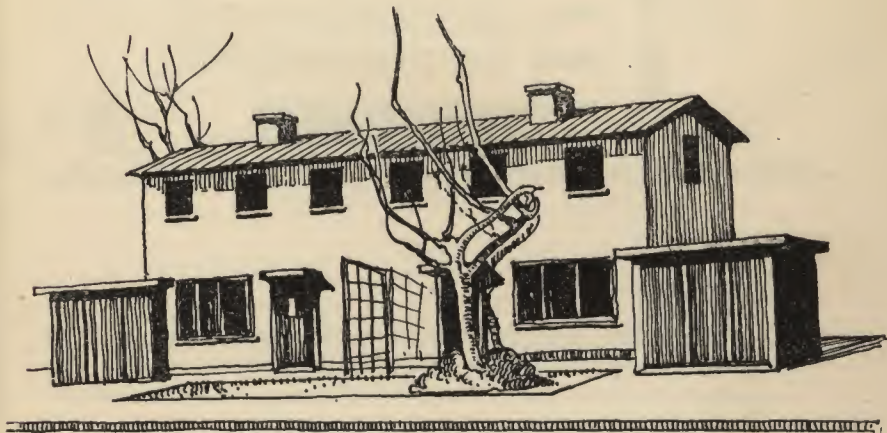
FERRYMAN'S COTTAGE:

Contoured base plate of plaster with buildings of Bristol board; water consists of glass, clear, overpainted sea bottom. (Courtesy of the Liverpool School of Architecture.)

Opposite: another student model of a type of housing intended for post-war reconstruction. Millboard is used for the house with the various features painted in poster colour; real twigs have been used to represent trees; the grass plot is sandpaper painted green, with sponge at the base of the trees.

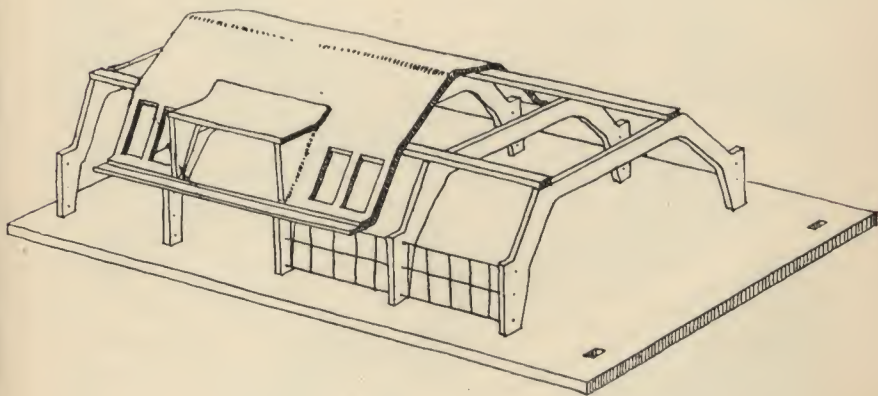
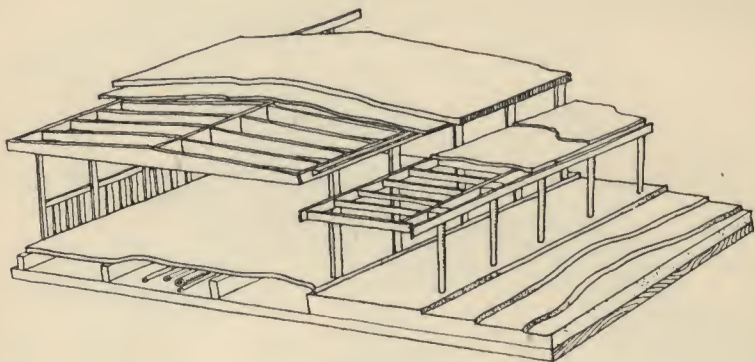


*Above :
an interior model
by a first-year student for
an L.M.S. enquiry bureau. The
model was intended to stimulate the appre-
ciation of three-dimensional relationships. Cardboard,
wood, wire, etc., have been used to produce a convincing picture.
(Courtesy of the Architectural Association School of Architecture.)*

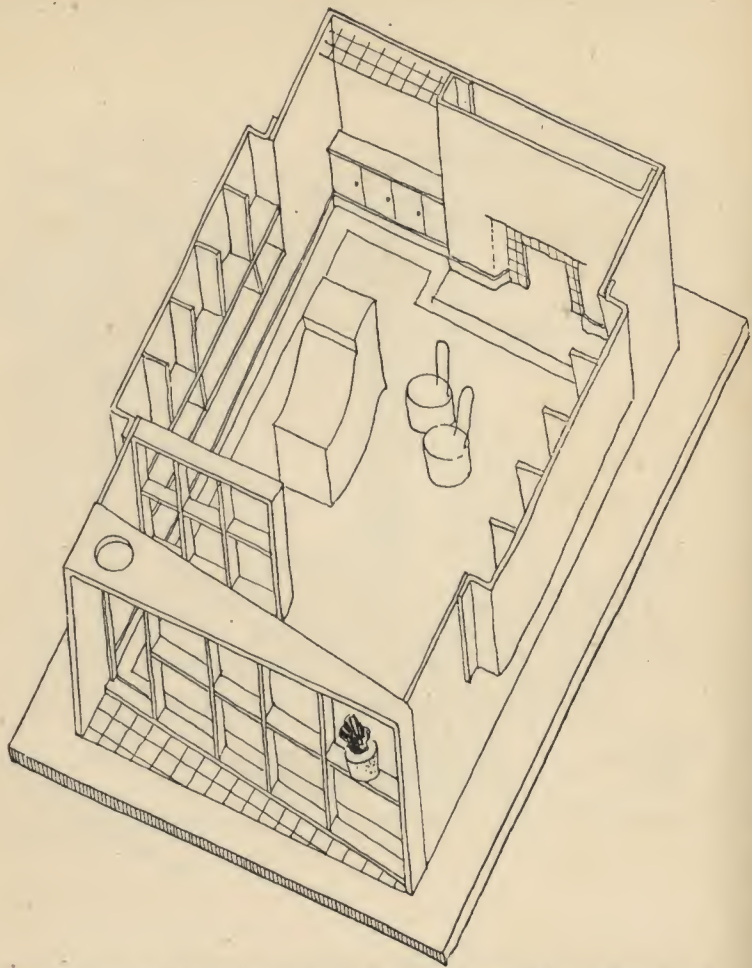




A MODERN HOSPITAL BUILDING: From a model by the author. Wood blocks with long windows, slightly incised to give relief; balconies are wood, stuck to the main mass; windows, etc., are cut from actual scale prints of the model and glued to the blocks.



THE CONSTRUCTIONAL MODEL: Example of experimental models made by students with the object of studying pre-fabricated construction and lighting in connection with modern school buildings. Cardboard, wood, plaster and wire are materials used for modelling.



Model design for a FLOWER SHOP made from thick cardboard and paper; pieces of cork with wire insertions for chairs; the counter is a block of wood; the plant pot was made from cork, sponge and wire.



THE PLANNING MODEL: Model of an industrial village by a group of second-year students. Some of the materials used were as follows: plywood base, sanded in parts; trees, loofah; buildings, Bristol board and paper; water, painted. (Courtesy of the Liverpool School of Architecture.)

